TELEPHONE (410) 268-7261
FACSIMILE (410) 268-0145

Construction Services International, Inc.
918 Chesapeake Avenue, Annapolis, Maryland 21403

23 April 2003

United States Environmental Protection Agency
Region 2
New Jersey Superfund Branch II
Emergency and Remedial Response Division
290 Broadway, 19th Floor
New York, New York 10007-1866

Attention: Mr. Joe Gowers
Project Manager

Subject: Groundwater Monitoring Plan
NL Industries Superfund Site
Pedricktown, New Jersey

Dear Mr. Gowers:

On behalf of the Interim Pedricktown Site Group (Group), Construction Services International, Inc. (CSI) has prepared this Groundwater Monitoring Plan to describe the procedures that will be used to obtain and analyze samples of groundwater from selected groundwater monitoring wells located at the NL Industries Superfund Site in Pedricktown, New Jersey. The purpose of the proposed monitoring event is to evaluate groundwater quality at the site following the completion of remedial activities for soil and sediment.

CSI will implement the monitoring event using sampling and analytical techniques that are generally consistent with those described in the *Sampling, Analysis and Monitoring Plan* (SAMP) and *Quality Assurance Project Plan* (QAPP), which were included in the *Remedial Design Work Plan* [GeoSyntec, 1997] previously approved by the United States Environmental Protection Agency (EPA). CSI's goal is to obtain samples of groundwater that are representative of aquifer conditions using low-impact techniques that are generally consistent with the procedures described in *Low-Flow (Minimal Draw down) Ground-Water Sampling Procedures* [Puls and Barcelona, 1998]. CSI will document the results of the monitoring event in a written report.

Background

Groundwater data have been periodically obtained from the site since 1983. The most recent evaluations of groundwater at the site were performed by the Group from 1997 through 1999 and were presented in the *Phase I Groundwater Evaluation Technical Memorandum* [GeoSyntec, 1998] and the *Phase II Groundwater Evaluation Technical Memorandum* [GeoSyntec, 1999]. In both documents, GeoSyntec concluded that (i) groundwater quality at the site had previously been impacted by operations at the site and (ii) groundwater quality had

improved significantly following the termination of operations at the site. Also, in the *Phase II Groundwater Evaluation Technical Memorandum* [GeoSyntec, 1999], GeoSyntec recommended that consideration be given to evaluating possible remediation alternatives, including monitored natural attenuation and injection of alkalinity to enhance the removal of constituents from groundwater in combination with monitoring. Furthermore, residential wells were previously sampled and were determined to have been unaffected by site-related constituents.

Pursuant to a Consent Decree issued by EPA, the Group conducted remedial activities for soil and sediment, which were substantially complete in April 2003. The remedial action included the excavation, stabilization and off-site disposal of soil, sediment and debris that contained lead at concentrations above the remedial action objective. As described in the *Phase II Groundwater Evaluation Technical Memorandum*, it is possible that the removal of soil, sediment, and debris from the site may result in improved groundwater quality at the site. During the performance of the remedial activities at the site, several groundwater monitoring wells were accidentally damaged. Two monitoring wells, MW-29 and MW-30, were damaged and abandoned. Several monitoring wells (i.e. HS, IS, JD, RS, and T-C) were damaged and need to be abandoned. Two monitoring wells, KS and KD, were destroyed.

Monitoring wells KS and KD were located in the area where lead and cadmium were most highly concentrated in groundwater. To provide a means to continue to monitor groundwater quality in that area, CSI will install two new wells at the approximate former locations of KS and KD. One of the new wells will be installed to a depth of approximately 20 feet (i.e. to replace KS) and the other to a depth of approximately 30 feet (i.e. to replace KD). The new wells will include 10 feet of 0.010-inch slot well screen. For consistency of well identification, the replacement wells will be identified as KSR and KDR. CSI will also abandon damaged monitoring wells HS, IS, JD, RS, and T-C, in accordance with New Jersey Department of Environmental Protection regulations.

Certain other wells may have been damaged during remedial activities, but the damage is not apparent based upon visual observations. The bentonite seal of monitoring well MW-27 may have been compromised such that there is an insufficient seal between the top of the well screen and the land surface. CSI will further evaluate monitoring well MW-27 and other wells selected for sampling during the implementation of this groundwater monitoring plan. As described in additional detail below, CSI will use turbidity and other field parameters during this monitoring event to evaluate whether or not representative samples of groundwater can be obtained from the monitoring wells. If necessary, CSI will recommend abandonment of additional wells that were damaged during the remedial action.

Groundwater Monitoring

CSI will initiate groundwater monitoring activities at the site upon receipt of EPA's approval of the procedures and schedule provided herein. During the groundwater monitoring event, CSI will (i) measure the depth to groundwater in each well to be sampled; (ii) monitor

field parameters; (iii) obtain groundwater samples; (iv) submit the samples for laboratory analysis for volatile organic compounds (VOCs), total lead and cadmium, and dissolved lead and cadmium; (v) validate the laboratory data; and (vi) prepare a report to summarize the data. For comparison of data, CSI will collect groundwater samples from the monitoring wells last sampled in 1999, where possible, plus replacement wells KSR and KDR. Monitoring wells preliminarily selected for sampling are identified in Table 1. A site plan is provided as Figure 1. CSI will evaluate the groundwater quality at the selected wells using field parameters to determine whether or not the groundwater sample is representative of aquifer conditions (e.g. low turbidity and stable field parameters).

CSI does not plan to obtain samples of groundwater from the residences along Benjamin Green Road or U.S. Route 130. The groundwater quality at the residences was determined to be unaffected during the previous groundwater evaluations. On-site groundwater quality was noted to be improving and there was no indication that site-related constituents had any potential to affect groundwater at the residences. Therefore, no further sampling of residential wells is warranted.

CSI will use Pro-Active Industries™ submersible pumps or a similar product to perform low-flow groundwater sampling. The proposed submersible pumps are lightweight, small diameter pumps designed to operate effectively at very low to moderately low pumping rates. The proposed pumps are designed for low-flow sampling and are well suited to minimize disturbance of groundwater and promote collection of groundwater samples that are representative of aquifer conditions. The Pro-Active Industries™ submersible pumps can be dedicated to the wells at the site. If dedicated pumps are used, each pump will be used to sample only one well and there will be no need to decontaminate the pumps after use. The use of dedicated pumps and disposable sampling equipment is recommended by Puls and Barcelona as an excellent method of avoiding possible cross contamination of samples.

STL of Pittsburgh, Pennsylvania will analyze the samples for total lead, dissolved lead, total cadmium, and dissolved cadmium using EPA method ILM04.0 and VOCs using EPA method 8260B. The instrument detection limits for lead and cadmium will be 1.7 micrograms per liter (ug/L) and 0.3 ug/L, respectively. The detection limits for VOCs will vary in accordance with the requirements of the EPA method. Samples will be preserved in accordance with the appropriate EPA method. Samples to be analyzed for total lead and total cadmium will not be filtered. Samples to be analyzed for dissolved lead and dissolved cadmium will be filtered in the field using disposable filters. CSI will use in-line and other field portable equipment to monitor groundwater parameters in the field including: dissolved oxygen, turbidity, specific conductance, oxidation-reduction potential, pH and temperature. CSI will document field parameters and use the results to evaluate whether or not a sample is representative of groundwater quality in the aquifer. Quality assurance/quality control (QA/QC) procedures will be generally consistent with those described in the QAPP and will be modified appropriately to accommodate the use of dedicated and disposable sampling equipment.

Possible Contingency Activities

In the event of equipment malfunctions or lack of yield from a monitoring well, CSI may modify the sampling procedure to obtain representative groundwater samples. For example, CSI will measure field parameters using in-line (i.e. flow-through equipment) to the degree possible. However, to decrease the volume of water required from a low-yield monitoring well, CSI may obtain small volumes of water in clean containers and measure field parameters using portable meters. Also, if well yield is low and low-flow sampling cannot be performed without excessive draw down (i.e. without drying the well or increasing turbidity), then CSI may use an alternative method of sampling such as (i) removing one or more well volumes of groundwater from the well, (ii) drying the well several times prior to obtaining samples, or (iii) performing sampling over two days (i.e. CSI may purge a well on one day and obtain a sample from the well on the following day after the water level recovers). As a last resort, if a bailer is necessary to obtain a groundwater sample, then CSI will carefully lower a disposable bailer into the well, avoiding agitation to the degree possible, to retrieve sufficient water to fill sample bottles.

Field parameters will be used to evaluate whether or not a sample of groundwater is representative of ambient groundwater. If the turbidity of a sample is greater than 10 NTUs, then CSI will not consider the sample to be representative of ambient groundwater conditions (i.e. apparent constituent concentrations will be biased high). Field parameters that do not stabilize or that vary significantly from previous measurements or measurements made at nearby locations may indicate that a sample is not representative of ambient conditions. High turbidity or other indicators of groundwater quality may be used to determine whether or not the integrity of a monitoring well was compromised during the remedial action. If the turbidity of the groundwater sample is above 10 NTUs or if field parameters do not stabilize or appear inconsistent with previous data or data obtained nearby or if turbidity is high, then CSI may request that the sample be omitted from laboratory analysis or that the data be qualified, if analyzed. CSI will evaluate the groundwater quality data and make recommendations regarding well use or abandonment after the initial monitoring event.

QA/QC

QA/QC procedures to be performed will be consistent with the QA/QC procedures previously used for groundwater monitoring. Applicable QA/QC procedures outlined in the *QAPP* will be used to validate groundwater data. The laboratory will use the QA/QC procedures required by the selected analytical method.

Data Evaluation and Reporting

Upon receipt of laboratory data from STL, CSI will validate the data and prepare a report to present the data and summarize the findings. The report will include a description of procedures, QA/QC information, and a comparison of new data to previously collected data to evaluate whether or not groundwater quality at the site continues to improve. The report will also

include recommendations for additional work at the site, which will include additional monitoring, and could include the abandonment of additional wells and/or the installation of additional or replacement monitoring wells. CSI and the Group also anticipate that the new data will supplement the information provided in the *Phase II Groundwater Evaluation Technical Memorandum* [*GeoSyntec, 1999*] and GeoSyntec's recommendation that consideration be given to evaluating alternate remedial options, including the injection of alkalinity to enhance the removal of constituents from groundwater.

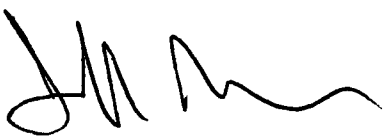
Schedule

CSI recommends that the replacement wells KSR and KDR be installed and developed and that abandonment of the obviously damaged wells be performed approximately two weeks prior to groundwater sampling is performed to minimize any effects of drilling. After installing KSR and KDR and abandoning selected wells, CSI will perform groundwater monitoring activities at the site in May or June 2003 upon receipt of EPA's authorization to proceed. At the present time, CSI anticipates that a report to present the data and summarize the findings would be submitted to EPA within 11 to 12 weeks after the commencement of groundwater sampling activities.

If you have any questions, please call J. Dustin Ferris or me at (410) 268-7261.

Sincerely,

CONSTRUCTION SERVICES INTERNATIONAL, INC.



Jeffrey W. Moore, P.G., P.E.
Principal

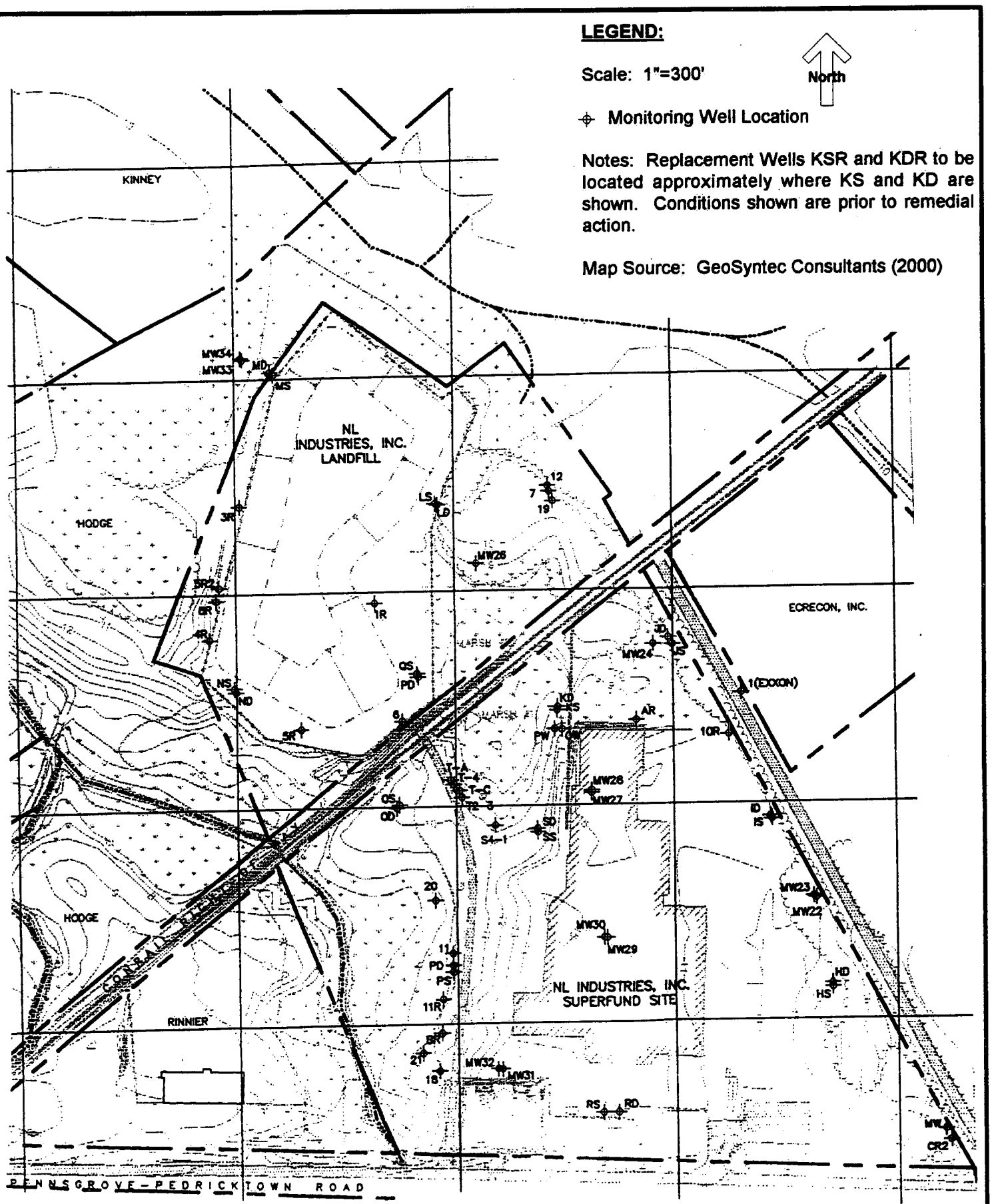
cc: Mr. Paul Harvey – New Jersey Department of Environmental Protection (w/attachments)
Technical Committee, Interim Pedricktown Site Group (w/attachments)

Attachments

Table 1
Planned Groundwater Monitoring Locations and Well Construction Details
NL Industries Superfund Site
Pedricktown, New Jersey

Monitoring Well	Casing Diameter	Well Depth [1]	Screened Interval [2]	Top of Casing Elevation [3]	Depth To Water [4]	Aquifer Zone [5]
BR	4	39	33-39	10.82	3.4	UA
JS	2	17	17-27	13.89	5.12	UA
KSR[6]	2	approx. 20	approx. 10-20	TBD	TBD	UA
KDR[6]	2	approx. 30	approx. 20-30	TBD	TBD	UA
NS	2	16.5	6.5-16.5	13.24	NM	UA
ND	2	24	14-24	12.29	NM	UA
OS	2	21.3	6.3-21.3	10.92	5.63	UA
OD	2	37.3	12.3-37.3	13.38	6.52	UA
SS	2	16.4	6.4-16.4	12.7	4.78	UA
SD	2	29.4	17.4-29.4	13.39	5.47	UA
11	4	54.1	34.1-54.1	11.19	3.64	UA
22	2	16	11-16	13.01	7.02	UA
23	2	24	24-34	12.85	6.81	UA
26	2	22	12-22	10.77	NM	UA
27 [7]	2	15	5-15	15.45	9.28	UA
28	2	30	20-30	15.28	9.15	UA
31	2	15	5-15	13.21	6.91	UA
32	2	30	20-30	13.16	7.8	UA
33	2	10	5-10	5.44	NM	UA
34	2	20	10-20	5.44	NM	UA
12	4	78.2	58.2-78.2	12.81	NM	FCA
24	2	73	68-73	11.92	14.92	FCA

[1] Depth to bottom of well in feet below top of casing (TOC), prior to remedial action.
[2] Screened interval of well in feet below ground surface, prior to remedial action.
[3] TOC elevation in feet above mean sea level, prior to remedial action.
[4] Depth to water in feet below TOC, measured in April 2003.
[5] UA = Unconfined Aquifer , FCA = First Confined Aquifer
[6] Well construction information is preliminary.
[7] Bentonite seal may have been damaged. CSI will evaluate further using field data.
NM = Not measured. Only wells potentially affected by remedial action were evaluated.
TBD = To be determined.



Sheet 1 of 1	File Name: SitePlan.vsd Prepared by: JWM Date: 22 April 03 Revision: 0 Scale: 1"=300'	**Figure 1** **Site Plan** NL Industries Superfund Site Pedricktown, New Jersey	Construction Services International, Inc. 918 Chesapeake Avenue Annapolis, Maryland 21403